

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Calculus Review for Q2 Test 1

Mr. Callahan

This review sheet should NOT serve as your only review. Be sure to review your notes and homework as well.

1. An object moves along a line so that its position at time  $t$  is given by  $s(t) = t^3 - 9t^2 + 24t + 3$  where  $t \geq 0$ .

- What is the object's position at time  $t = 3$ ?
- What is the object's velocity at time  $t = 3$ ?
- What is the object's acceleration at time  $t = 3$ ?
- Is the object speeding up or slowing down at  $t = 3$ ? Justify your response.
- When is the object at rest?
- When is the object moving right?
- How far does the object travel in the first 4 seconds?

2. An object moves along a line so that its position at time  $t$  is given by  $s(t) = t^3 - 4t^2 + 4t + 3$  where  $t \geq 0$ .

- What is the object's position at time  $t = 3$ ?
- What is the object's velocity at time  $t = 3$ ?
- What is the object's acceleration at time  $t = 3$ ?
- Is the object speeding up or slowing down at  $t = 3$ ? Justify your response.
- When is the object at rest?
- When is the object moving left?
- How far does the object travel in the first 4 seconds?

3. Differentiate each of the following with respect to  $x$ .

a.  $y = \ln x^5$

b.  $y = \ln(3x^2 + 2x)$

c.  $y = e^{4x^3+2}$

d.  $y = \ln\left(\frac{-2x^4}{x^2}\right)$

e.  $y = e^{(2x)^2}$

f.  $y = \frac{1 - e^{3x}}{2 + e^x}$

g.  $y = (e^x - x)^2$

h.  $y = x^5 - \ln(x) + 5e^2$

4. Write an equation for the line tangent to  $f(x) = 2x^3 + \frac{5}{x^2} - 3$  when  $x = 1$ . (Round all values to the nearest thousandth.)

5. Write an equation for the line tangent to  $f(x) = 3\sqrt{x} - 5e^{x^2} + 7\ln(2x+1)$  when  $x = 2$ . (Round all values to the nearest thousandth.)